

PhD openings in Quantum Materials Engineering

Prof. Laraoui at the University of Nebraska-Lincoln is hiring graduate students to join the [Quantum Sensing & Defect Discovery and Spectroscopy Lab](#). Two NSF funded projects are available:

1. Develop and study hybrid photonics nanostructures for scalable quantum communication networks. This project is in collaboration with [Prof. Christos Argyropoulos](#) from The Pennsylvania State University (Penn State). The student is expected to perform nanofabrication and modeling at Penn State and do quantum optics experiments at UNL.
2. Develop quantum biosensing technology to perform micro/nano-scale magnetic resonance imaging of biomaterials (single cells, proteins, etc.). This project is in collaboration with [Prof. Paresh Ray](#) from Jackson State University (JSU).

These research activities are mainly experimental and involve:

- ❖ Perform quantum optics experiments.
- ❖ Quantum protocols: pulse control, optical initialization and readout, magnetic field control, etc.
- ❖ Interfacing experiments to collect data using LabVIEW, Python or other programming languages.
- ❖ Materials and device nanofabrication: EBL, DWL, thin film evaporation/sputtering, RIE/ICP etching, focused ion beam (FIB), etc.
- ❖ Materials and device characterization: AFM, TEM, SEM, XRD, XPS, Raman, etc.

Motivated students interested in learning new laboratory skills in solid-state physics, quantum optics, and nanomaterials science are encouraged to contact Dr. Laraoui at alaraoui2@unl.edu. In your email, please include a motivation letter about your background, research interests and future research goals, your academic resume (CV) that includes published papers, attended conferences/workshops, and list of two or three references including your research supervisor if you have done any research. Ideally students should have a Bachelor or master's in physics, Materials Science, Engineering (electrical, materials, computer, etc.), or other related fields. Interested applicants should have at least one of the following skills: basic/advanced background in programming (LabView, Python, Matlab...), data analysis (Mathematica, MATLAB, Origin Lab), design (CAD, SolidWorks...), MW/RF electronics, materials synthesis and characterization, nanofabrication, and experimental research in any related topic.

Students will have the opportunity to get trained at National labs such as Sandia National Labs and at Penn State, attend national (APS and MRS Meetings) and international conferences/workshops, etc.

More information about Dr. Laraoui's research can be found at <https://engineering.unl.edu/laraoui/>

For information about the application process to enroll in a PhD in Materials Engineering:
<https://engineering.unl.edu/graduate-programs/phd-materials-engineering/>

A very competitive research assistantship (starting salary is ~ \$32,000) with health-insurance benefits and tuition support are offered.